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Hierarchy Leadership and Social Distance in Charitable Giving

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This article investigates the effect of hierarchy leadership and social distance on prosocial behavior in a field experimental setting of sequential charitable giving conducted in an organization. The treatments vary in whether the leading (first) donor's identity is revealed to the following donors as a hierarchy leader, a peer, or a stranger. The followers' giving in the Leader and Peer treatments responds positively to the leader's giving, but no significant response is found in the Stranger treatment. However, on average, the followers in the Leader treatment give less than those in both the Peer and Stranger treatments. This is due to a negative effect on the followers' giving when the leaders contribute a small amount in the Leader treatment.

JEL Classification: H41, D82, O13, C93

1. Introduction

Ethical leadership has become more and more important in the business world. Many studies on ethics and leadership focus on the normative or philosophical perspectives (Brown and Trevino 2006); however, little empirical evidence has been provided on these theoretical insights. Leadership giving is widely used in fundraising campaigns (Andreoni 2006), but the effect of hierarchy leadership is not easy to comprehend because it introduces elements that can affect the follower's giving in different directions. On one hand, it may have a negative effect on the follower's giving if the follower is concerned with outperforming their leader. On the other hand, the follower may feel obligated to contribute more if the leader sets a good example, because the followers are inclined to follow the call of duty or social responsibility of ethical leaders (Dirks and Ferrin 2002). In this article, we study empirically how real hierarchy leaders in an organization and the social distance between the leading donor and followers might influence employees' or followers' charitable giving behavior through different channels.

In order to formalize the hypotheses, we develop a two-player model of sequential charitable giving to examine the effect of the first mover's (leader's) hierarchy leadership on the second mover's (follower's) giving behavior. The follower responds to the leader's giving by conforming to a social norm that depends on both the relative social status between the follower and the leader and the giving amount of the leader, when taking into account the follower's altruistic and social image concern. We show that the follower's contribution is larger when the marginal benefit from the warm-glow effect, the public good provision, and the social approval is larger, and when the contribution is made more public. Importantly, a larger social comparison cost may increase or decrease the follower's giving, depending on whether the follower's contribution is smaller or larger than the social norm.

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It is challenging to identify the causal effect of hierarchy leadership on the follower's prosocial behavior because of the endogeneity problem associated with the peer effects (Manski 1993; Brock and Durlauf 2000). We adopt the approach of randomized field experiments to create exogenous variations in the social distance between the leader and the followers. The hierarchy leadership effect might be compounded with two additional effects, namely, the reference point effect and the peer effect. We define the hierarchy effect as the influence of the leader's hierarchy position or social status on the giving of someone who has a lower rank or status within the same organization. The peer effect is defined as the effect on charitable giving when solicitation induces comparison to those socially close to the solicitee or potential donors in the fundraising campaign. The effect of a reference point is the influence on the follower's contribution from the presence of the contribution level of a previous donor. When the follower is informed of the contribution amount of their hierarchy leader, this information automatically serves as a reference point and creates a peer effect, in addition to the hierarchy effect of the leader. In order to identify the pure hierarchy effect, we have to disentangle the peer effect and reference point effect.

To create variations in the social distance between the leader and the followers, we vary the information disclosed to the followers. In the first treatment, Leader treatment, the leader's name, affiliation (department), and giving amount are all revealed to the followers. In the second treatment, Peer treatment, we only show the affiliation and the contribution amount of the leader to the followers, without revealing the leader's identity. Hence, no hierarchy effect influences the followers' contributions. However, the follower knows that the presented contribution is from one of their colleagues in the same department. In the third treatment, Stranger (Baseline) treatment, only the giving amount of the leader is revealed to the followers as a reference point. The followers do not know the leader's name and department. We conducted the experiment in a large public university in Singapore by soliciting the university faculty members for contributions to a charity that provides financial aid to low-income families that support a family member with blood cancer. We approached department chairs (leaders) first, following which we approached other professors (the followers) in the same department as the leaders.[1] The followers within a department are randomly assigned into the three treatments.

We report the following findings. First, the followers' average giving depends on the existence of hierarchy leader and social distance. The average giving in the Peer treatment is 21% and 13% higher than that in the Leader and Stranger treatments, respectively, which highlights the tendency that the followers do not give more than their hierarchy leader. Second, the effect of hierarchy leadership depends not only on the existence of the hierarchy leadership but also on the size of the leader's giving. The followers' giving in the Leader treatment is significantly smaller than those in the both Peer and Stranger treatments when the leader's giving is small ($10 or $20).[2] However, when the leader's giving is relatively large ($50 or $100), the followers' giving in the Leader treatment is significantly larger than that in the Stranger treatment and is not significantly different from that in the Peer treatment. Therefore, the hierarchy leadership discourages the followers' giving only when the leader gives a relatively small amount, but it has a positive effect on the followers' giving when the leader's giving is large. Third, the followers' giving responds positively to the leader's giving amount at significantly higher rates in the Leader and Peer treatments than that in the Stranger treatment. According to the theory, the estimated responsiveness of the followers' giving to the

[1] Unlike academic departments in the west, the department chair in a university in Singapore is viewed as of higher hierarchy.

[2] For simplicity, $ in this article refers to Singapore Dollar (SGD). The exchange rate between SGD and US Dollar (USD) is 100 SGD for 80 USD approximately.

leader's giving reflects the specific social norm that the followers make social comparison. Relative to the Stranger treatment, the followers in the Leader and Peer treatment give 0.23–0.27 and 0.15–0.34 dollars more for every 1 dollar increase in the leader's giving. The estimated responsiveness in the Stranger treatment is not significantly different from zero. These estimates imply that the followers tend to proportionally match the amount given by their leader or their colleagues but not a "stranger."

This article is closely related to the literature on sequential charitable giving (see Vesterlund 2016 for a comprehensive survey). In explaining why in practice fundraisers solicit donors sequentially, Vesterlund (2003) suggests that it may result from sequential play being effective in reducing the uncertainty associated with the quality of the public good when the lead donor's contribution serves as a signaling device. Alternatively, Romano and Yildirim (2001) characterize the types of preferences that give rise to greater contributions under sequential play, for instance, when individuals are reciprocal or conformists (Bernheim 1994). Potters et al. (2005, 2007) investigate experimentally the role of sequential moves when the quality of the public good is uncertain and the initial contribution is partially revealing. They find that under asymmetric information, sequential giving improves total contributions and facilitates information transmission. Experimental tests on the model by Romano and Yildirim (2001), where preference rather than asymmetric information is the reason for sequential giving, is mixed. Kumru and Vesterlund (2010) report an experiment and find that aggregate contributions and earnings are larger when high-status donors are solicited before rather than after those of low status.

Our article does not focus on the effect of sequential giving compared to simultaneous giving or try to distinguish between the two explanations by Vesterlund (2003) and Romano and Yildirim (2001), although our model has the same spirit as in Romano and Yildirim (2001), in which they assume that the followers have a preference to conform to the lead donor's contribution. Instead, we ask what type of information on the lead donor may induce more contributions from the followers, given the setting of sequential giving. In particular, we examine the effect of information that is about whether the lead donor possesses a hierarchy leadership on the followers' behavior.

From this perspective, our article contributes to the literature on how status and hierarchy affect prosocial behavior. Ebeling et al. (2017) find that people are also more prone to donate to a homeless individual when the previous donor has a higher social status. Jack and Recalde (2015) evaluate the effect of leadership by example on voluntary public good provision in a field setting and show that using local authorities as a lead donor increases public good provision compared to a setting with a random lead donor or no lead donors. Another article by Andreoni and Scholz (1998) finds that donors respond positively to an increase in contributions by others in their reference group defined in terms of socioeconomic variables.

Our article also contributes to the literature on the effect of social information on charitable giving and the literature on social recognition and giving such as List et al. (2004), Rege and Telle (2004), Karlan and McConnell (2014), Samek and Sheremeta (2014, 2015), and others. Frey and Meier (2004) find that information about the average contribution in the past has a significant impact on contribution. Shang and Croson (2009) demonstrate a positive social information effect on individual contributions in a public radio fundraising campaign. They find that the most influential level of social information is drawn from the 90th to 95th percentile of previous contributions, and the effect is significant for new members but not for renewing members. Alpizar et al. (2008) conducted a field experiment by showing potential donors others' typical contribution and find that a lower reference point ($2) encourages participation but decreases conditional contribution and a higher reference point ($10) increases conditional contribution only.

As a summary, our experiment has several original contributions to the literature. First, our experimental design involves a real hierarchy structure among the donors, which is novel compared to other studies that create subjects' status in the laboratory or the social status does not have a hierarchy structure. Second, consistent with List and Lucking-Reiley (2002) and Shang and Croson (2009), we also find that followers positively respond to the lead donor's contribution. We further show that the slope in our experiment significantly depends on the lead donor's hierarchical characteristics perceived by the followers. Third, most importantly, different from previous studies, because our design varies within department and leader how much information about the lead donor is provided to followers, we are able to disentangle the effect of the amount contributed, from the hierarchy of the leader or the peer effect.

Theoretically, the higher total contribution in sequential giving compared to simultaneous giving derived by Romano and Yildirim (2001) not only requires that followers positively respond to the lead donor's contribution but also requires that the lead donor fully anticipates the followers' response and initiates a large contribution. In our experiment, to provide a clean test on the followers' behavior, we did not endogenize the lead donor's choice as part of the game, that is, the lead donor was not told that the information on his contribution will be used to solicit followers' contribution. Nevertheless, our experiment presents a possible scenario where the total contribution can be low conditional on the lead contribution is low and the lead donor has a hierarchy leadership. Specifically, if the lead donor is myopic or careless in choosing his contribution or underestimates his influence on other donors' contribution, then he may set a bad example rather than a good example and may decrease the total contribution. Finally, our results also shed light on fundraising strategies for charities to choose between announcing an exogenous amount of seed fund or endogenous donors' contribution in sequential solicitations.

The remainder of the article is organized as follows. Section 2 presents the model. Section 3 explains the experimental procedure. Section 4 reports the results. Section 5 concludes.

2. The Model

In this section, we model a situation where a leader and a follower make charitable contributions to a cause sequentially.[3] The model focuses on whether the follower is willing to give to a charity, and if so, how much to contribute. We assume that there is complete information about the quality of the charity, so no need for the leader to signal the quality of the cause to the follower arises as in the model of Vesterlund (2003).

We adopt an additive formalization for a potential donor's decision problem, similar to the models in Alpizar et al. (2008) and DellaVigna et al. (2012). The follower cares about his private income $Y_F - g_F$, where Y_F is his initial income and g_F is his contribution to the public good, the total amount of public good G, his self-image, I_F, and his social approval, S_F. The follower's utility function is given by

$$U_F = (Y_F - g_F) + \alpha_G G + I_F + S_F, \tag{1}$$

where we assume that $0 < \alpha_G < 1$ so that the marginal utility of private income is larger than the marginal utility of money given to the public good. The amount of the public good is the sum of the follower's own contribution, g_F, and the contribution by other donors, G_{-F}, so that $G = g_F + G_{-F}$.

[3] In the experiment, there are multiple followers corresponding to a same leader. However, we did not reveal the existence of other followers.

We assume that the follower's self-image depends on two components: his own contribution (due to, for instance, the warm-glow effect defined by Andreoni 1989) and whether his contribution conforms with the social norms. On one hand, when given the leader's contribution g_L as a reference point, he would like to be as generous as his leader. On the other hand, if within a culture where people have a hierarchy consideration, the follower may choose his contribution corresponding to his social status relative to the leader's. Consequently, the follower faces an ideal level of giving relative to his leader's giving that depends on social culture and norms. The follower incurs a disutility from deviating from these norms. Formally, we write the follower's self-image as follows:

$$I_F = \alpha_W g_F - \beta(g_F - \gamma g_L)^2, \tag{2}$$

where $\alpha_W > 0$ implies that the follower's self-image increases with his own contribution. $\beta > 0$ is the marginal cost of deviating from a particular social norm and measures to what extent the follower cares about the comparison with his leader or conforming to the social norm. The parameter $\gamma > 0$ represents different social norms the follower would like to follow in different scenarios. For instance, $\gamma < 1$ may reflect the idea that when the hierarchy consideration is salient, the follower wants to keep his contribution lower than the leader's contribution in order to match their corresponding social status.

Finally, we model social approval in a similar fashion as DellaVigna et al. (2012), where the follower compares his contribution to an exogenous cutoff contribution level g_S. Social approval is written as follows:

$$S_F = (1-a)\theta(g_F - g_S), \tag{3}$$

which induces a positive utility when the follower's contribution is greater than g_S and a negative utility when it is smaller than g_S. The utility of social approval also depends on the degree of anonymity of the follower's action, which is denoted as a. The difference between g_F and g_S influences the utility of social approval when $a = 0$ (completely public case) but not when $a = 1$ (completely anonymous case). Finally, θ denotes the marginal benefit (marginal cost) of social approval.

Substituting Equations 2 and 3 into Equation 1, we have

$$U_F = U_F^0 - (1-\alpha_G)g_F + \alpha_W g_F - \beta(g_F - \gamma g_L)^2 + (1-a)\theta(g_F - g_S), \tag{4}$$

where $U_F^0 \equiv Y_F + \alpha_G G_{-F}$ is the follower's utility level without contributing to the public goods. Assuming an interior optimum and given the level of anonymity a, we can solve for the follower's optimal contribution level g_F^*:

$$g_F^* = \frac{(\alpha_G - 1) + \alpha_W + (1-a)\theta}{2\beta} + \gamma g_L. \tag{5}$$

Comparative Statistics

From Equation 5, g_F^* increases when α_G, α_W, or θ is larger, that is, when he derives higher marginal benefits from the total public good provision, the warm-glow effect, or the social approval. We treat α_G, α_W, or θ as exogenous variables but focus more on the effect of the social comparison cost β, the leader's contribution g_L, the follower's responsiveness to the leader's contribution γ, and the anonymity choice a.

(1) The effect of social comparison cost β:
When $\alpha_W + (1 - a)\theta = 1 - \alpha_G$, that is, the marginal utility of warm-glow and social approval, $\alpha_W + (1 - a)\theta$, is equal to the net cost of contribution, $1 - \alpha_G$, the follower's optimal contribution perfectly matches the social norm regardless of β, that is, $g_F^* = \gamma g_L$.[4] When $\alpha_W + (1 - a)\theta > 1 - \alpha_G$, the follower's contribution $g_F^* > \gamma g_L$ and g_F^* is decreasing in the marginal cost of social comparison, β. By contrast, when $\alpha_W + (1 - a)\theta < 1 - \alpha_G$, the follower's contribution $g_F^* < \gamma g_L$ and g_F^* is increasing in β. Therefore, the social comparison cost, β, tends to force the follower's contribution g_F^* to move towards the social norm γg_L.

(2) The effect of leader's contribution g_L:
The follower's contribution responds to the leader's contribution by a rate of γ, according to the first derivative of the follower's optimal contribution:

$$\frac{\partial g_F^*}{\partial g_L} = \gamma. \tag{6}$$

(3) The effect of anonymity parameter a:
The follower contributes more when the contribution is less anonymous, based on the following derivative:

$$\frac{\partial g_F^*}{\partial a} = -\frac{\theta}{2\beta} < 0. \tag{7}$$

PROPOSITION 1. The follower's optimal contribution, g_F^*, has the following properties:

(a) g_F^* increases in the marginal benefit from the warm-glow effect α_W, the public good provision α_G, and the social approval θ, and when the contribution is public rather than anonymous (a = 0 vs. a = 1);
(b) The response of g_F^* to the social comparison cost β can be zero, positive, or negative, depending on whether g_F^* is equal to, smaller than, or larger than the social norm γg_L;
(c) g_F^* increases with the leader's contribution g_L with a proportion of γ.

Treatments and Hypotheses

According to Equation 5, both social comparison parameters, β and γ, play an important role in determining the follower's donation and his response to the leader's contribution. Parameter β captures the extent to which the follower cares about social comparison. Parameter γ defines the target of social comparison, which is affected by the social norm in a particular environment. Intuitively, when the social distance is smaller, β is larger, because people tend to compare more with others who are close to them. Our experiment creates variations in the social distance between a leader and her followers (the value of β) and variations in the social norm (the value of γ) through the following treatments, where γ^k and β^k ($k = L, P, S$) denote the corresponding parameters in different treatment k.

[4] Alternatively, we can rewrite the condition as $\alpha_W + \alpha_G + (1 - a)\theta = 1$. Hence, when the sum of pure and impure altruistic concern and social approval is equal to the marginal cost of giving, the follower always gives according to the social norm.

- Leader treatment: The follower is asked to donate in an environment where the leader has real hierarchy leadership. In this case, the follower has a lower social status than the leader, so we conjecture that $\gamma^L < 1$, that is, the follower likes to conform to a smaller amount than the leader has contributed in order to avoid being offensive to the leader by donating "too much;" however, γ^L might not be too small because the leader's contribution also serves as an example of generosity, so the follower may feel obligated to respond positively to the leader's contribution. We expect a larger γ^L if the leader's contribution has a stronger effect of leading by example. On the contrary, we predict a smaller γ^L when the discouraging effect of hierarchy concern dominates other elements. Moreover, we expect a high value of β^L because the follower should care about the social comparison with the leader. In the empirical context, Singapore is known for being a merit-based authoritative (meritocracy) society. Singaporeans adhere to a hierarchical relationship in society. Differences in rank are signaled and reinforced by the style of the interaction between the parties involved. Respect and formality towards superiors are the norm (Craig 1994). Moreover, a majority of Singaporean are Chinese descendents influenced by Confucian culture that emphasizes the impact of peer effects. Hypothetically, hierarchy leaders should have the strongest impact on followers' behavior, and strangers have the least influence.
- Peer treatment: In this treatment, the leader's identity is only revealed as a peer of the follower. Therefore, the follower should perceive that the leader (first-giver) has a similar social status as his own. We conjecture that $\gamma^P > \gamma^L$ because the follower is more likely to match or respond positively to the giving of his peer without worrying about donating more than the peer. Therefore, we have a null hypothesis that $\gamma^P > \gamma^L$. We conjecture a positive and significant β^P because peer is one kind of close social relationships that affect people's daily life. Furthermore, we conjecture that the effect between peers may be less than that in the Leader treatment, that is, $\beta^P < \beta^L$, because the hierarchy leader can also be considered as a peer of the follower at the minimum.
- Stranger treatment: In this treatment, because the follower only sees a donation amount, the leader has no social connection with the follower and is simply a first mover. We conjecture that both β^S and γ^S are small than in the Leader and Peer treatments. That is, the follower not only cares less about comparing with the leader's contribution, but also he cares less about the exact amount the leader has contributed. In this case, the follower's contribution may be driven mostly by warm-glow and/or pure altruism.

According to the discussion above, we derive the following null hypotheses.

Null Hypothesis 1. The Leader treatment has the highest marginal cost from social comparison, and the Stranger treatment has the lowest marginal cost from social comparison (i.e., $\beta^S < \beta^P < \beta^L$).

Null Hypothesis 2. The follower's contribution is most responsive in the Peer treatment and least responsive in the Stranger treatment (i.e., $\gamma^S < \gamma^L < \gamma^P$).

3. The Experiment

In this experiment, we created a real charitable good by collaborating with the Leukemia & Lymphoma Foundation (LLF, henceforth) in Singapore for the conduction of the experiment. LLF is registered as a nonprofit organization and has a charity status. Its primary mission is to fight blood

cancers and provide financial assistance to low-income patients, as well as providing other supports to the patients and/or their families. Leukemia and Lymphoma are among the most curable cancers, but the treatment is very expensive and needs long-term care. Because the treatment involves chemotherapy, stem cell transplantation, or special medication, it needs to be undertaken in the long term and causes a huge financial burden for patients to cope with. Therefore, the financial, counseling, and emotional support from LLF can be crucial for the well-being of patients and their families.

The fundraising campaign was launched at Nanyang Technological University in Singapore and targeted at the faculty members. We chose such a population for several considerations. First, there is a longer tradition to respect seniority and people with a higher social status under the Asian culture than the Western culture. So, the effect of social comparison may be more salient if we conduct the experiment in Asia. Second, the hierarchical structure between the leader and the followers should be comparable for different groups of leader and followers. A large university seems to be a perfect ground to conduct the field experiment because there exist many departments and each department has a more or less similar hierarchy structure. In addition, with the information on the seniority of professor ranks available on the Internet, we can control for the income effect. Finally, we can minimize direct social interactions among the potential donors during the solicitation process given that every professor has his/her own office.

In different treatments, we created the variation in the social distance between the leader and the followers in the sequential giving to LLF. We chose the chair of each academic department (division) as the leader and other professors or teaching faculty members in the same department as the corresponding followers. Specifically, the leader was first solicited and then the followers were disclosed different amount of information regarding the leader's contribution in three treatments. With such an experimental design, we can obtain observations across different treatments with the same leader. Meanwhile, we have a group of leaders contributing different amounts to the charity so that the treatment effect, if any, does not rely on one particular leader's giving amount and his/her specific characteristics.

We have three treatments in total. In the Stranger treatment, only the leader's giving amount was disclosed to the followers. However, we did not disclose any information regarding the leader's identity including his/her name or affiliation. Therefore, the followers were not aware that the amount shown to them was in fact their chair's giving but only knew that it was from a previous donor. This treatment can capture the reference-point effect, that is, the impact of a giving amount from the leader. In the Peer treatment, we disclosed both the leader's giving amount and his/her affiliation (the name of the department). However, we did not reveal the leader's name. Therefore, the follower only knew that one of his peers/colleagues had given a certain amount to the charity. The Peer treatment captures both the reference-point effect and the peer effect. In the third Leader treatment, the leader's identity/name, department name, and giving amount were all disclosed to the followers. This treatment captures not only the peer effect but also the effect of hierarchy leadership. The essential difference between the three treatments is the information disclosed on the pledge card for donation. Examples of the pledge cards for the followers are illustrated in Figure 1 for the Leader, Peer, and Stranger treatment, respectively, from the left to right.

The experimenters tried to finish the solicitation within each department in a short span of time in order to prevent communications between potential donors. As well, the solicitation was always conducted in an independent office of a potential donor instead of the hallway or a conference room. During the campaign, four solicitors went around for donations in fixed mixed-gender pairs. The solicitors were undergraduate students majoring in Economics. All four solicitors are local Singaporean students, with no salient physical difference, such as disability, from normal undergraduate students. In order to ensure consistency, they followed a standardized procedure, including the soliciting message, gender and pair combination, and donation pledge cards.

Treatment 1: Leader Disclosed		
Name	Division	Amount
Professor X	Economics	$10

Treatment 2: Colleague Undisclosed		
Name	Division	Amount
-	Economics	$10

Treatment 3: No Disclosure		
Name	Division	Amount
-	-	$10

Figure 1. Examples of Pledge Cards in Leader, Peer, and Stranger Treatments (from Left to Right).

(1) For each department, we started the solicitation process by approaching the leader (chair) of the department. On the day of solicitation, the solicitors showed him/her a donation card like the one in Figure 2, which was the actual pledge card with the organization information. We printed the leader's name and affiliation on the card, so that he/she knew that other donors (followers) might observe his/her identity. However, we did not tell the leader that this campaign was an experiment, neither did we tell that we would approach other professors in the department and disclose different amount of information on the leader's contribution. No information of any other donors appeared on the solicitation card for the leader. All leaders that the solicitors managed to approach, except one, gave a positive amount. None of the leaders asked to keep themselves anonymous.

(2) After the solicitors obtained the leader's contribution, they prepared the pledge cards for the followers according to the three treatments described above and went to approach other professors in the same department. If the professor was in the office and opened the door, one solicitor then presented the soliciting message as the following: "Hi Prof., can we get 5 minutes of your time? We are a group of volunteers representing the Leukemia & Lymphoma Foundation (LLF). We are basically going around to create awareness of the foundation, as well as to raise funds at the same time. To highlight some points regarding leukemia and lymphoma, they are blood disorders which are curable but very expensive at the same time. Patients have to go through procedures like chemotherapy, stem cell transplant or special medication taken over long term, which is a huge financial burden to cope with. If you are interested in donating to these needy patients, you can do so by penning down your donations on this pledge card. Thank you."

    At the beginning of the solicitation message, the other solicitor provided the potential donor with an LLF brochure and a proof letter from the LLF showing that the solicitors were volunteers of the charitable organization. The brochure clearly identified the charity status of the organization, and the proof letter was used to establish the credibility of the solicitors.

(3) Towards the end of the soliciting message, the solicitors showed the pledge card to the professor, making sure that he/she could see the information about the leader's contribution on the card. The front of the card was shown first, and after that, the solicitors opened the card and provided instructions on how to fill up the relevant information of the donor and the giving amount. For all followers, the pledge card only contained information about the leader's contribution (with different amount of information in different treatments), but it did not include any information on other followers' contribution. That is, for each follower, we prepared a new pledge card instead of using the same pledge card for different followers, which is crucial in controlling for the information that is intended to be disclosed in different treatments.

    In some cases, the solicitation process had to be ceased before the potential donor saw the pledge card. Usually in those cases, the solicitors were interrupted and asked to leave the room during delivering the solicitation message. Given the fact that these potential donors did not see the different information on the pledge card before deciding not to donate, we cannot allocate these

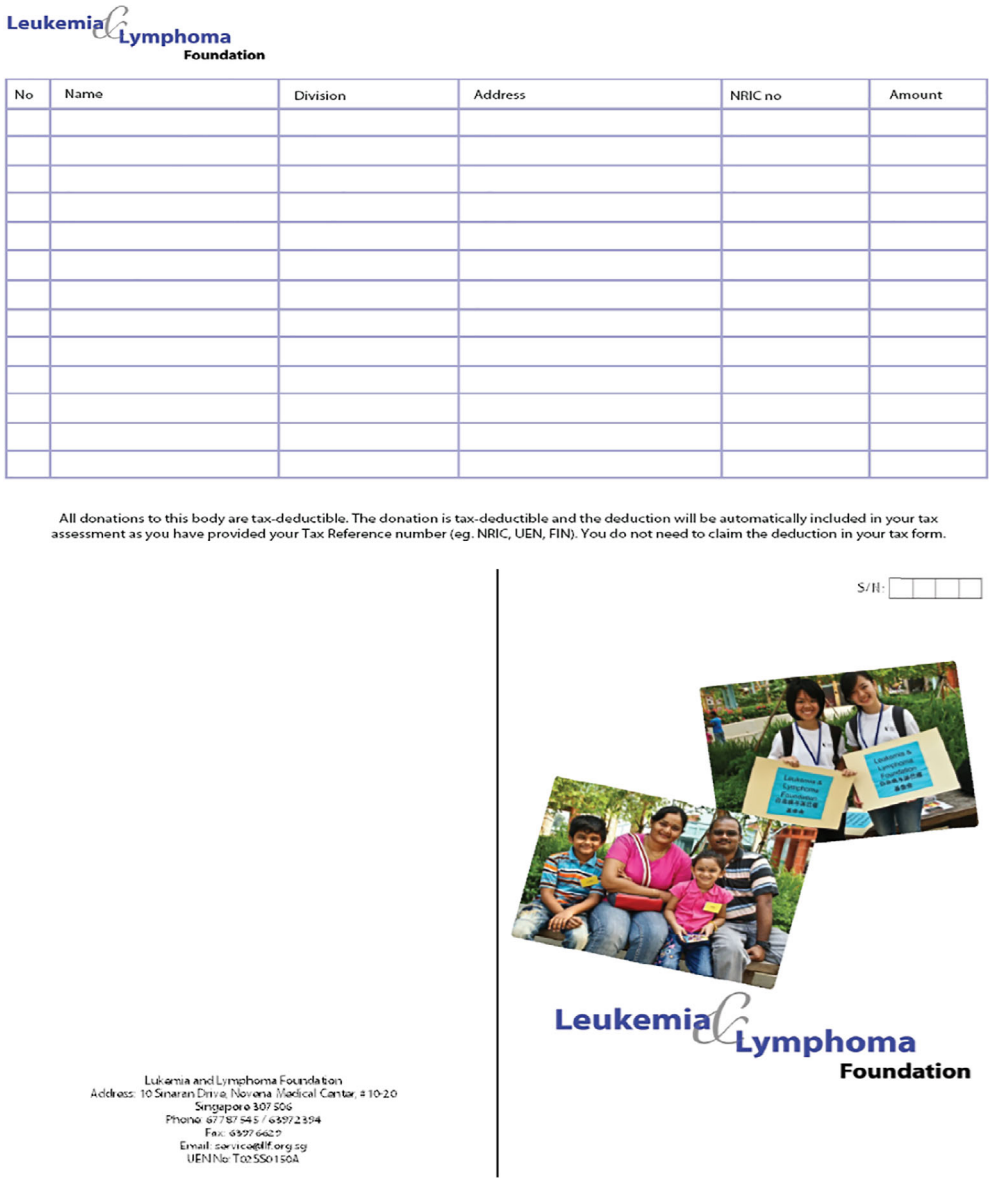

Figure 2. The Inside and Front Pages of the Actual Pledge Card. [Color figure can be viewed at wileyonlinelibrary.com]

cases to a particular treatment. As a result, observations we present in each treatment all have a positive giving amount. Although we realize that it may be a more informative data set if we observe the zero contribution in each treatment, it was much more natural to describe the cause first to the potential donor before showing the pledge card during the solicitation. When a potential donor declined to contribute, the solicitors approached the next professor using the same pledge card.

(4) If a potential donor decided to contribute, the solicitors wrote down his/her amount of contribution. All donations are in cash, except only one in check. Credit cards were not allowed to use during contribution. After the donors decided the contribution amount, they could choose whether to keep anonymous or not. No contribution was revised after the donors knew about the possibility of keeping anonymous.

(5) At the end of the session, the solicitors informed the donor that the donation was tax deductible and expressed our appreciation that the donor helped out to create more awareness of the LLF.

4. Experimental Results

Summary Analysis

In total, we approached 321 professors, among which 212 donated a positive amount. The total contribution is $4224, with an average giving of $20. In the sample, we have 21 leaders (department chairs) who gave $25.40 on average. All but one leader are male, and all the leaders are tenured professors. There are 191 followers who gave $19.30 on average. The donors came from eight different schools in the university. Table A1 in Appendix A shows the sample distribution across schools and treatments in more details. The Stranger, Peer, and Leader treatments have 57, 64, and 70 observations/followers, respectively.

For 2 of 21 leaders, we did not have observations on the followers' contribution for some of the treatments, which left 19 leaders remaining in the analysis. Among these 19 leaders, 6 gave $10 (1 gave $8 and is counted in the category of $10 for convenience), 8 leaders gave $20, 4 gave $50, and 1 gave $100. Among the 191 followers, 4 donated $100 and are determined as outliers by the Grubbs test that is also known as the maximum normed residual test.[5] In the end, we dropped 7 observations, 4 of them with a follower's contribution of $100 and 3 of them dropped together with the two leaders mentioned above,[6] which leaves 184 observations on the followers' contribution in the analysis. Among them, 67, 62, and 55 observations are from the Leader, Peer, and Stranger treatment, respectively. Robustness checks using the sample including the four outliers can be found in Appendix B.

Table 1 presents the distribution of the followers' giving by different criteria. Out of the 184 followers in our analysis, 110 gave at the lowest category ($10 or below), 46 gave at the medium level (larger than $10 and smaller or equal to $20), and 28 gave at the highest level (above $20 and smaller or equal to $50). If classified by the leader's giving, 75, 72, and 37 followers are in the group with the leader's giving at $10, $20, $50/$100, respectively. We further calculate the distribution of the followers' giving by their positions, gender, anonymity choice, and solicitor group, as shown in Table 1. The majority of the observations are from associate and assistant professors, and 20 of the 184 followers are female. All these factors are potentially important determinants of charitable giving behavior and need to be controlled for in the robustness checks.

Table 2 shows the summary statistics of the contributions from both the leaders and the followers. The followers' giving amounts are presented for each level of the leader's giving and in each treatment separately. As shown in the last three rows of Table 2, the followers in the Leader treatment give the least and those in the Peer treatment give the most on average. The average giving of the followers in the Stranger, Peer, and Leader treatments is $17.9, $19.4, and $16, respectively, which results in a difference of $2 (13%) between the Stranger and the Leader treatments and a difference of $3.4 (21%) between the Peer and the Leader treatments. Statistically, the difference is insignificant

[5] The Grubbs test detects one outlier at each iteration and is iterated until no outliers remain. By the same test, leaders' contribution of $100 is not an outlier. Among the four outliers of followers, two observations (from one associate and one assistant professor) are in the Peer treatment and the amount contributed by the first donor is $10. One observation (from one professor) is in the leader treatment with first donor giving at $10. Another observation (from an associate professor) is in the Stranger treatment with the first donor giving at $20.

[6] The baseline estimation including these three observations is similar as those reported in the main text.

Table 1. The Distribution of Followers' Giving in Different Groups

		By Treatment			By Leaders' Giving			By Followers' Giving		
		Leader	Peer	Stranger	$10	$20	$50/$100	(0, $10]	($10, $20]	($20, $50]
Professor	13	5	4	4	7	5	1	6	4	3
Associate professor	83	30	29	24	33	34	16	53	19	11
Assistant professor	73	27	23	23	30	26	17	43	18	12
Other positions	15	5	6	4	5	7	3	8	5	2
Male	164	60	54	50	70	67	27	97	43	24
Female	20	7	8	5	5	5	10	13	3	4
Non-anonymous	110	61	26	23	42	41	27	69	23	18
Anonymous	74	6	36	32	33	31	10	41	23	10
Solicitor group A	69	24	23	22	27	33	9	45	14	10
Solicitor group B	115	43	39	33	48	39	28	65	32	18
Sum	184	67	62	55	75	72	37	110	46	28

Notes: Other positions are mostly lecturers. One leader who gave $8 is in the group with leaders giving $10.

between the Stranger and the Leader treatments ($p > 10\%$) but marginally significant between the Peer and the Leader treatments ($p < 10\%$), by using one-sided *t*-tests (122 and 129 observations, respectively).

Although the overall treatment effect is not highly significant, there exists a significant and different pattern of the treatment effect when we examine the followers' giving conditional on their associated leader's giving. In particular, we find that, in the Leader treatment, the leaders' giving at a small amount discourages the followers' giving, whereas the leaders' giving at a large amount encourages the followers' giving. For instance, in Table 2, when the leaders' giving is $20, the followers in the Leader treatment on average gave $5.4 and $6.9 *less* than those in the Peer and Stranger treatments. However, when the leaders' giving is $50, the followers in the Leader treatment gave on average $10.1 and $3.1 more than those in the Peer and Stranger treatments. This feature of the followers' giving conditional on the leaders' giving also holds if we examine the summary statistics within each school, as shown in Table A2 in Appendix A.

Figure 3 presents the relationship between the average giving of the followers and the giving amount of the leaders for each treatment. In the Stranger (Baseline) treatment, there appears no significant positive correlation between the followers' giving and the leaders' giving. In the Peer treatment, there is a robust positive relationship between the leaders' giving and the followers' giving. In the Leader treatment, there is a negative (not significant) relationship between the leaders' giving and the followers' giving at the lower levels of the leaders' giving, but a positive relationship at the higher levels of the leaders' giving.

We also conduct both *t*-tests and Wilcoxon–Mann–Whitney (WMW) tests on the differences in the followers' giving conditional on the leaders' giving between different treatments. Specifically, when the leaders' giving is low, at $10 or $20, we test the null hypothesis that the followers' giving in the Leader treatment is smaller than that in the both Peer and Stranger treatments. When the leaders' giving is high, at $50 or $100, we test the null hypothesis that the followers' giving in the Stranger treatment is smaller than that in the both Peer and Leader treatments. Table 3 below provides the *p*-values of these tests. Indeed, when the leaders' contribution is at the low level, $10 or $20, the null hypothesis is supported by both tests. When the leaders' contribution is at the high level, $50 or $100, the difference is significant using the WMW test but not the *t*-test. This may be due to the smaller sample size associated with large contributions of the leaders, which makes the *t*-test not appropriate.

Table 2. Summary Statistics of Donors' Contribution by Treatment

Leader's giving	Number of Leaders	Treatment Group	Number of Followers	Mean	Median	Standard Deviation	Minimum	Maximum
10	6	Leader	29	13.7	10	10.8	5	50
		Peer	24	17.5	10	13.5	2	50
		Stranger	22	16.8	10	13.9	10	50
20	8	Leader	24	11.9	10	4.93	2	20
		Peer	25	17.3	12	12.6	1	50
		Stranger	23	18.8	12	13.2	10	50
50	4	Leader	11	27.5	20	20.2	4	50
		Peer	9	24.4	10	19.4	10	50
		Stranger	7	17.4	10	16.7	2	50
100	1	Leader	3	30	20	17.3	20	50
		Peer	4	32.5	35	20.6	10	50
		Stranger	3	19.7	5	26.3	4	50
Total	19	Leader	67	16	10	13	2	50
		Peer	62	19.4	10	14.8	1	50
		Stranger	55	17.9	10	14.3	2	50

Table 3 documents the test results on the average difference among followers' giving across treatment, conditional on the giving of department head. In order to test whether the reference amount given by department head exerts different influence across treatments, we conducted the Jennrich multivariate test on whether the correlations between leaders' giving and the followers' donations differ across treatments.[7] As shown in Table 4, we can reject the null hypothesis that the correlations between leader and follower's giving are equal between the Leader and Stranger Treatment at 2.5% of significance level. For the Peer and Baseline Treatment, one can only reject the equality of correlation at 18% level of significance. For the Leader and Peer treatment, one cannot reject the equality of correlation between leaders' and followers' giving. These results are consistent with the slope coefficients between followers' and leaders' giving across treatments as demonstrated in Figure 3.

As a summary for this subsection, we find different patterns in the followers' responses to the leaders' contribution in different treatments. In the Stranger treatment, the followers' giving is least responsive to the leaders' contribution, resulting in relatively constant contributions no matter whether the leaders' contribution is low or high. In the Leader treatment, the followers' giving has a nonlinear relationship with the leaders' giving. If a leader gives a small amount, disclosing the identity of the leader seems to be a bad idea to raise donations. However, if a leader gives a large amount, disclosing the leader's identity encourages more giving from the followers. This finding may be due to the followers' consideration of social comparison upon seeing the leader's contribution when the leader possesses a real hierarchy leadership, which has driven the followers to contribute less when the leader's contribution is low and pushed the followers to contribute more when the leader's contribution is high. In contrast, the leader's giving in the Peer treatment has a consistently positive effect on the followers' giving. This might reflect the fact that social comparison concern is simpler among peers without hierarchy leadership over each other.

[7] We thank the editor's suggestion on conducting the correlation test. This is corresponding to the estimates in the regression Table 5 on the interaction terms between leaders' giving amount and treatment dummies, but these are the partial correlation controlling for other factors.

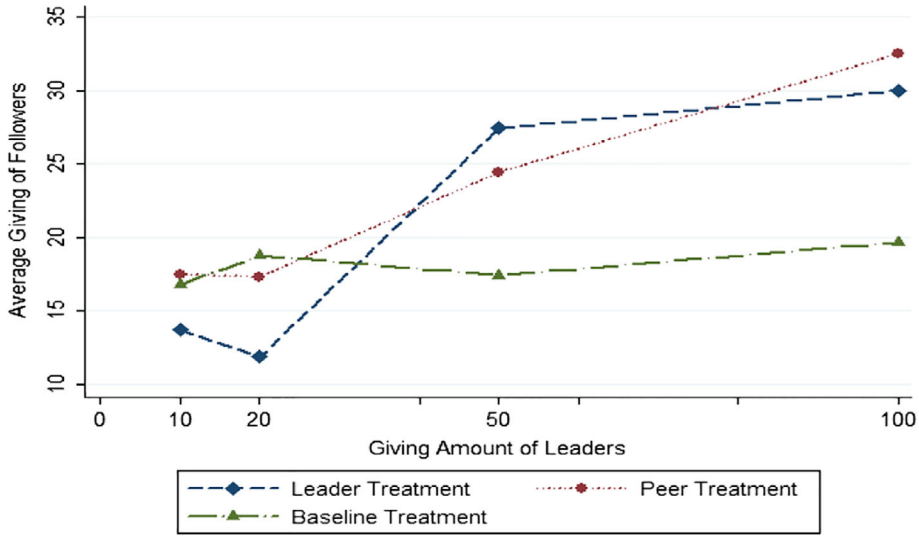

Figure 3. Followers' Average Giving in Response to Leader's Giving across Treatments. [Color figure can be viewed at wileyonlinelibrary.com]

Estimating Treatment Effects

In order to control for factors affecting followers' giving, such as leaders' giving amount, we also estimate the treatment effect.[8] Moreover, the responsiveness of the followers towards the leaders' giving differs in different treatments, as documented in the summary analysis. Hence, it is important to incorporate the interaction items between the treatment dummies and the leaders' giving. In addition, we include control variables such as the followers' position, gender, solicitor group, school and division fixed effects, being anonymous, and the interaction item between the followers' position and the leader's giving. A benchmark model is formalized as follows:

$$g_{F,i} = \alpha + \sum_{t=1}^{2} \beta_{treat}^{t} treat_i^t + \beta_e g_{L,i} + \sum_{t=1}^{2} \beta_{interact}^{t} treat_i^t * g_{L,i} + X_i \beta_X + \xi_i, \tag{8}$$

where the dependent variable $g_{F,i}$ is the follower i's giving. The independent variables include two dummy variables for the Leader and Peer treatment $treat_i^1$ and $treat_i^2$, the leader's giving faced by follower i, $g_{L,i}$, and the interaction items between the treatment dummies and the leader's giving, $treat_i^t * g_{L,i}$. X_i are the other control variables mentioned above.

The estimation results are presented in Table 5. The estimate for the leader treatment dummy is significantly negative, implying that the followers in the Leader treatment gave significantly less than those in the Baseline treatment when the leader's contribution is low. Hence, the followers' contribution in the Peer treatment is not significantly different from those in the Baseline treatment when the leader's contribution is low. These estimates can also be understood as the approximation of the intercepts in Figure 3. Equation 5 in the model section describes the follower's optimal

[8] Note that the treatment effect is on the treated. We cannot do an intent-to-treat analysis on the zero giving cases since a donor was assigned into different treatments only after they agreed to give. On the other hand, around one-third of the entire group we solicited declined to give before seeing the treatment information. It may significantly affect the indication and interpretation of the treatment effect if we include these zero contributions using the intent-to-treat analysis.

Table 3. p-Value of Tests on Followers' Giving Conditional on Leaders' Giving

	g_L at \$10 or \$20		g_L at \$50 or \$100	
Alternative hypothesis	$g_F^L < g_F^S$	$g_F^L < g_F^P$	$g_F^L > g_F^S$	$g_F^P > g_F^S$
p-Value (*t*-test)	0.020	0.015	0.108	0.141
p-Value (WMW test)	0.020	0.012	0.079	0.057
Number of observations	102	98	24	23

contribution and shows that a larger social comparison cost β results in a smaller contribution from the follower when the leader contributes zero (i.e., a smaller intercept in Figure 3). Therefore, the estimates for the treatment dummy are consistent with our conjecture that $\beta^L > \beta^P > \beta^S$.

In Table 5, the followers' responsiveness to the leader's giving, γ, is estimated by the coefficients for the interaction items $treat_i^t * g_{L,i}$ in different treatments. Relative to the Baseline treatment, the followers in the Leader and Peer treatments gave 0.15–0.34 dollars more for every 1 dollar increase in the leader's giving. Moreover, this coefficient is significant in the Leader and Peer treatments but insignificant in the Baseline treatment, which suggests that there is no reference-point effect when the followers are informed of the giving amount of a stranger. But the reference-point effect is stronger when the leader is a peer or the department chair of the followers. The coefficients on leader's giving interacting with Peer treatment is smaller than that on Leader treatment by −0.70 but are not significantly different (with a *t*-statistics of −0.91).

The negative level effect of hierarchy may be due to the lower income of the followers compared to their leaders, so we incorporate the position dummies to proxy the income level of the followers because higher ranked professors earn a higher income in Singapore. The position titles include Full Professor, Associate Professor, Assistant Professor, and part-time lecturers. There are evidences showing associate and full professors gave significantly more than others. Another issue might arise from anonymity. The followers who choose to donate non-anonymously will contribute around \$2 more than those who choose to be anonymous. However, it is statistically insignificant, which suggests that being recognized by other people does not play a significant role in our experiment.

We also consider the specifications by adding divisional dummies and school dummies, because there might be school or division fixed effects, such as income level, academic background, and office culture, which could potentially affect charitable contribution. Most of the estimated coefficients for department and school dummies turned out to be insignificant.[9] The findings on treatment effects are not significantly affected, as shown in Table 5.

Robustness checks with the four outliers are presented in Appendix B. We replicate and compare with Table 5. The estimated effect of leader treatment is \$0.5 to \$1.4 smaller but still significant except column 1. The estimates on the interaction items between first donor's giving and Peer treatment dummy are still positive but insignificant. Full professor dummies show a much larger impact on giving and most estimates become significant.

Heterogeneous Treatment Effects

Our regression results for the treatment effects have shown that there is a large difference in the hierarchy effect when the leaders' giving is at different levels. As a robustness check, in this subsection, we evaluate the treatment effects by conducting regressions for three groups of the

[9] The results of the estimated department and school fixed effects are not reported in Table 5 but available from the authors.

Table 4. Tests of Equality of Correlation Matrices between Followers' and Leaders' Giving

	Leader vs. Stranger	Peer vs. Stranger	Leader vs. Peer
Null hypothesis	$corr\left(g_L^L, g_F^L\right) = corr\left(g_L^S, g_F^S\right)$	$corr\left(g_L^P, g_F^P\right) = corr\left(g_L^S, g_F^S\right)$	$corr\left(g_L^L, g_F^L\right) = corr\left(g_L^P, g_F^P\right)$
Chi-squared	5.00	1.81	0.82
p-Value	0.0254	0.1781	0.3664
Observations	122	129	117

followers who are categorized based on the level of the leaders' giving. In Table 6, we report three regressions, using the observations conditional on the leaders' giving at \$10, \$20, and \$50/\$100. We include the treatment dummies and other control variables that are the same as in Table 5.

As seen from column 5 in Table 6 for the group with the leaders' giving at \$10, the followers in the Leader treatment gave \$9.1 less than those in the Baseline treatment, given everything else equal. The followers in the Peer treatment also gave less than those in the Baseline treatment, but the difference is insignificant. For the leaders' giving at \$20, the estimated coefficients are negative for the Leader and Peer treatments, but neither of them is significant. For the leaders' giving at the level of \$50 or \$100, the followers in both the Leader and Peer treatments gave significantly more than those in the baseline treatment, by \$19.8 and \$25.1, respectively, after controlling for the impact of other factors. These results are consistent with the findings from Table 5. That is, the hierarchy effect in the Leader treatment discourages the followers' giving when the leader's contribution is low. However, both the peer effect and the hierarchy effect are positive when the leader's contribution is high.

Columns 2–4 in Table 6 show the results from the regressions without the control variables. With additional control variables, the signs of the treatment effects are not affected, but the absolute values are relatively larger. Most of the estimated coefficients on the control variables have the correct sign but are not significant. When followers choose to be anonymous, they tend to give less. Tenured professors give more than junior professors and other teaching faculty, when the leaders' giving is \$10. The coefficient of the female dummy turns out to be mixed in terms of the sign and significance. This result might be due to the small female sample size in our data.

Combining the findings on the intercept coefficients and slope coefficients and their difference across treatments, we can conclude that there exists a positive peer effect and a positive hierarchy effect when the leader's contribution is high, indicated by the significant responsiveness of the followers' contribution to the leader's giving. However, the hierarchy leadership has a negative effect when the leader's contribution is very low.

Social Comparison

Based on the followers' optimal giving, $g_F^* = \frac{(\alpha_G - 1) + \alpha_W + (1-a)\theta}{2\beta} + \gamma g_L$, one can see that the followers' response depends on the leader's giving amount and the parameter of social comparison, γ, measuring the proportion of which the followers like to match the leader's giving. The constant item reflects the composite impact of the social preference for public goods, α_G, the warm glow effect α_W, the marginal benefit of social approval, θ, and the weight (marginal benefit/cost) followers put on social comparison in their utility evaluation, β. Across treatments, the social distances between the leader and the followers are different, and hence the parameters of social comparison, γ and β, should be also different. If we further assume that the altruistic preferences on average have similar effects across treatments, then the intercept in g_F^* reflects the inverse of β and the slope in g_F^* represents γ.

Table 5. Estimation on the Determinants of Followers' Giving

Model	(1)	(2)	(3)	(4)	(5)
Leader treatment	−7.237**	−8.997**	−9.222**	−8.806**	−9.749**
	(3.191)	(3.311)	(3.213)	(3.480)	(3.389)
Peer treatment	−2.340	−3.043	−2.949	−2.834	−5.601**
	(2.459)	(2.450)	(2.502)	(2.655)	(2.581)
Leaders' giving	0.0232	0.000432	−3.73e-05	0.0198	0.304
	(0.0471)	(0.0526)	(0.0572)	(0.0637)	(0.331)
Leaders' giving	0.226***	0.258***	0.258***	0.263**	0.272**
*Leader treatment	(0.0785)	(0.0887)	(0.0888)	(0.0966)	(0.109)
Leaders' giving	0.151***	0.187***	0.190***	0.189**	0.342***
*Peer treatment	(0.0518)	(0.0542)	(0.0590)	(0.0667)	(0.0540)
Leaders' giving					−0.954*
*Professor					(0.496)
Leaders' giving					−0.498
*Associate professor					(0.330)
Leaders' giving					−0.217
*Assistant professor					(0.306)
Professor		8.729	8.525	10.10	27.12***
		(5.721)	(5.646)	(5.844)	(8.964)
Associate professor		0.692	0.210	0.724	11.56**
		(3.927)	(4.207)	(4.202)	(5.413)
Assistant professor		2.911	1.134	1.768	6.247
		(3.325)	(3.416)	(3.397)	(5.048)
Anonymity		−1.994	−1.979	−1.961	−2.678
		(2.213)	(2.260)	(2.554)	(2.207)
Female		−0.767	−3.213	−4.787	−4.698
		(3.029)	(3.965)	(4.754)	(5.027)
Solicitor group A		0.763	4.140	2.697	6.302
		(2.182)	(3.784)	(3.250)	(4.508)
Constant	17.32***	16.48***	30.49***	11.19***	4.735
	(2.513)	(4.141)	(4.314)	(3.224)	(6.119)
School dummy	No	No	Yes	No	No
Department dummy	No	No	No	Yes	Yes
Observations	184	184	184	184	184
R-squared	0.094	0.120	0.173	0.220	0.269

Notes: Standard errors clustered by division are in parentheses.
***Significant at 1%.
**Significant at 5%.
*Significant at 10%.

In order to better evaluate the effects of social comparison in different treatments, we can directly estimate the reduced-form formula on the follower's giving response to the leader's giving derived from the theoretical model. Hence, we can estimate the social comparison parameters, γ and β, separately for every treatment j.[10] A benchmark model to approximate the followers' optimal giving is the following (we omit the index for individual observations):

$$g_F^j = \alpha^j + \gamma^j g_L^j + X^j \eta_X^j + \xi^j. \tag{9}$$

[10] This is essentially the same as adding interaction items in the estimation for treatment effects in Table 5, but it is easier to compare the coefficients when we estimate them separately.

Table 6. Estimation Results for Different Level of Leader Giving

Leaders' Giving	$10	$20	$50/$100	$10	$20	$50/$100
Leader treatment	−3.094	−6.908*	9.900*	−9.081**	−6.423	19.80**
	(3.770)	(3.046)	(3.725)	(3.376)	(4.199)	(6.162)
Peer treatment	0.682	−1.463	8.823	−2.253	−1.101	25.10***
	(2.415)	(3.534)	(5.394)	(2.420)	(3.585)	(5.366)
Anonymity				−6.913*	−0.235	−1.881
				(3.020)	(3.720)	(3.714)
Female				−4.236*	7.417	−21.34
				(1.844)	(11.82)	(10.22)
Professor				23.27***	−0.222	−3.758
				(5.397)	(4.600)	(22.82)
Associate professor				6.618*	2.716	−20.39
				(2.669)	(3.454)	(15.46)
Assistant professor				4.864***	1.725	−0.510
				(1.085)	(4.156)	(16.08)
Solicitor group A				3.388*	−0.126	13.57
				(1.449)	(3.805)	(7.208)
Constant	16.82***	18.78***	18.10***	9.919**	14.32**	20.50**
	(3.242)	(2.971)	(3.516)	(2.903)	(5.077)	(6.454)
Department dummy	No	No	No	Yes	Yes	Yes
Observations	75	72	37	75	72	37
R-squared	0.018	0.071	0.050	0.301	0.169	0.434

Notes: Robust standard errors clustered at department level are in parentheses.
***Significant at 1%.
**Significant at 5%.
*Significant at 10%.

As seen from columns 5–7 in Table 7, after controlling for the impact of observables and department fixed effects, the estimated coefficients on the response to the leaders' giving for the Leader, Peer, and Baseline treatments are 0.25, 0.14, and 0.18 (not significant) respectively. The estimated intercept coefficients are −5.4, 1.9 (not significant), and 10.9 (not significant), respectively. These parameters recovered the intercepts and slope coefficients in Figure 3.

Table 7 shows that the gamma associated with the Leader treatment is bigger than both gammas associated with Peer and Stranger treatments. That is, the givers are more responsive to the changes in the giving amount of leaders, comparing with the giving from peer and strangers. The beta in the Leader treatment is the highest, derived from the estimated constants given everything else in the constants equal across treatments.

The estimates show that, in the Stranger treatment, γ is smaller than that in the Leader treatment and is equal to zero statistically. But the estimated intercept is highest in the Stranger treatment, which implies that the followers put the lowest weight on the social comparison, β. The followers do not tend to match the a stranger's giving and do not care about the comparison with a stranger either. On the contrary, the followers in the Leader treatment have much higher γ and β, that is, they match their leaders' giving at a much higher level and put much more weight on comparing with their leader than an anonymous person. The estimated social comparison parameters in the Peer treatment are between those from the Leader and the Stranger treatments.[11]

The difference in professor rank is relative to the chair matters in the Leader treatment and not in the other two treatments. From the last three columns of Table 7, we see that both full professors

[11] The estimates using full sample with outliers in Appendix B (Table A5) are very similar as those from the sample without outliers, both quantitatively and qualitatively.

Table 7. Social Comparison among Different Treatments

Treatment	Leader	Peer	Stranger	Leader	Peer	Stranger
Leaders' giving	0.249***	0.174***	0.0232	0.247***	0.141***	0.183
	(0.0717)	(0.0389)	(0.0469)	(0.0549)	(0.0469)	(0.123)
Professor				23.72**	12.40	−6.598
				(8.674)	(13.82)	(14.10)
Associate professor				2.814	0.0306	5.213
				(2.746)	(6.928)	(15.52)
Assistant professor				9.974**	5.798	−5.455
				(3.716)	(6.518)	(13.13)
Anonymity				2.273	0.854	−0.413
				(4.154)	(8.374)	(6.408)
Female				−23.32**	1.585	−12.40**
				(9.166)	(12.69)	(5.090)
Solicitor group A				3.070	15.78**	−7.524
				(5.285)	(5.939)	(6.690)
Constant	10.08***	14.98***	17.32***	−5.403*	1.936	10.89
	(1.440)	(1.996)	(2.502)	(2.586)	(7.013)	(20.00)
Department dummy	No	No	No	Yes	Yes	Yes
Observations	67	62	55	67	62	55
R-squared	0.175	0.078	0.001	0.659	0.327	0.299

Notes: Robust standard errors clustered at department level are in parentheses.
***Significant at 1%.
**Significant at 5%.
*Significant at 10%.

and assistant professors give more contributions in the Leader treatment.[12] Furthermore, in Table A3 in Appendix A, the fraction of donors who gave more than the leader is much higher in full professors than in associate and assistant professors.

5. Conclusion

This article investigates the effect of hierarchy leadership and social distance on prosocial behavior in a setting of sequential charitable giving. The model shows that a follower (second mover) responds to a leader's (first mover's) giving conditional on the relative social status between the follower and the leader, as well as the amount given by the leader. We conducted a field experiment that varies the social distance between the leader and the follower in order to test the theoretical hypotheses.

The empirical findings show that the followers' giving depends on the social relationship with their leader. The followers' average giving in the Leader treatment is significantly smaller than those in the both Peer and Stranger treatments when the leader's giving is small ($10 or $20). However, the followers' giving in the Leader treatment is significantly larger than that in the Stranger treatment and has no significant difference with that in the Peer treatment when the leader's giving is large ($50 or $100). The followers' giving responds positively to the first mover's giving amount in the Leader and Peer treatments at significantly higher rates than that in the Stranger treatment, which suggests that the followers tend to match proportionally the giving amount of their leader or

[12] Although we did not create an indicator of difference in rank between chair and professors, the dummies of rank essentially captures the rank difference relative to chair because most chairs are the highest ranked professor.

their colleagues but not a "stranger." The presence of hierarchy leadership can discourage the followers' giving when the leader gives a relatively small amount. By allowing for different types of reference groups, we are able to distinguish how social comparison affects social preference when people have different social status.[13] Our findings have important implications on the practice of fundraising or generally on promoting prosocial behavior. In the literature, it has shown that the lead donor generally sets a good example in sequential giving and generates more contributions compared to simultaneous giving. However, in our setting, when the lead donor is unaware of his impact on others' giving and contributes a low amount, revealing the identity of the hierarchy leader might have a negative rather than positive effect in fundraising.

This study only focuses on the followers' giving behavior. It will be interesting and important to model leaders' behavior in such a setting. Moreover, our study did not investigate the treatment effects on the decision of giving or not. Lastly, our experiment is conducted in a university, so how the findings can be generalized to other organizations needs to be investigated. We leave these questions for future research on the topic.

Appendix A: Additional Tables of Summary Analysis

This section provides additional tables on the summary analysis on sample distribution and average giving (Tables A1 and A2). We also exploited the differences in professor ranks to examine the likelihood of giving more than the chair and

Table A1. Sample Distribution across Schools and Treatments

School	No. of Leaders	No. of Followers	Leader Treatment	Peer Treatment	Stranger Treatment
Civil and environmental engineering	3	21	6	8	7
Computer engineering	3	24	8	11	5
Electrical and electronic engineering	4	34	11	12	11
Humanities and social sciences	2	15	6	4	5
Materials science and engineering	1	7	3	2	2
Mechanical and aerospace engineering	2	31	11	10	10
Physical and mathematical sciences	2	36	14	11	11
School of business	3	23	11	6	6
Sum	21	191	70	64	57

Table A2. Average Giving of Leaders and Followers across Schools and Treatments

School	Leaders in All Treatments	Followers in All Treatments	Followers in Leader Treatment	Followers in Peer Treatment	Followers in Stranger Treatment
School of business	12.9	15.6	15.7	13.3	18
Mechanical and aerospace engineering	13.1	17.8	11.1	20.2	22.4
Physical and mathematical sciences	13.5	18.2	13.7	21.6	20
Electrical and electronic engineering	23.5	14.3	9.64	15.9	17.3
Computer engineering	26.7	17.2	22.5	15.5	12.4
Humanities and social sciences	28.5	16	16.3	30	10
Materials science and engineering	50	32.9	36.7	30	30
Civil and environmental engineering	58.1	21.2	22.5	25.3	15.6

[13] "The determination of the relevant reference group and the relevant reference outcome for a given class of individuals is ultimately an empirical question" (Fehr and Schmidt 1999, p. 821).

Table A3. Fraction of Donors Giving more than the Leader

Position	Statistics	Leader Treatment	Peer Treatment	Stranger Treatment
Professor	Fraction	0.5	0.75	0
	Number of all observations	6	4	4
Associate professor	Fraction	0.1	0.2	0.28
	Number of all observations	30	30	25
Assistant professor	Fraction	0.222	0.292	0.304
	Number of all observations	27	24	23
Others	Fraction	0	0.167	0
	Number of all observations	5	6	4
Total	Fraction	0.176	0.266	0.25
	Number of all observations	68	64	56

Notes: Fraction is for donors giving more than the leader among all donors (observations).

compared among different treatments. These are summarized in Table A3. Professors are more likely to give more than the leader, and this happened more in the leader and peer treatment. This is consistent with the differences in professor ranks that can be found in the regression results in Table 5, full professors give much more than lecturers and other professor ranks in the Leader treatment but not in the Stranger and Peer treatment.

Appendix B: Robustness Checks Using Full Sample

Tables A4 and A5 present the results using the sample with outliers in the same specification as those in Tables 5 and 7. For Table 5, the estimated effect of leader treatment is \$0.5 to \$1.4 smaller but still significant except column 1. The estimates on the interaction items between first donor's giving and Peer treatment dummy become insignificant. Full professor dummies show a much larger impact on giving and most estimates become significant. For Table 7, the estimates are very similar as those from the sample without outliers, both quantitatively and qualitatively.

Table A4. Estimation on the Determinants of Followers' Giving (Outliers Included)

Model	(1)	(2)	(3)	(4)	(5)
Leader treatment	−6.661	−7.226*	−7.537*	−6.967*	−8.366**
	(4.975)	(4.005)	(3.615)	(3.956)	(3.699)
Peer treatment	0.288	−0.851	−0.0703	0.239	−2.757
	(5.877)	(5.119)	(5.416)	(5.487)	(6.172)
Leaders' giving	0.0113	−0.00136	0.0399	0.0677	0.383
	(0.0488)	(0.0638)	(0.0776)	(0.0711)	(0.386)
Leaders' giving	0.194*	0.199**	0.193**	0.197**	0.197*
*Leader treatment	(0.0971)	(0.0893)	(0.0845)	(0.0880)	(0.0952)
Leaders' giving	0.0914	0.126	0.101	0.0819	0.226
*Peer treatment	(0.101)	(0.100)	(0.108)	(0.119)	(0.137)
Leaders' giving					−1.397*
*Professor					(0.755)
Leaders' giving					−0.486
*Associate professor					(0.391)
Leaders' giving					−0.210
*Assistant professor					(0.360)
Professor		16.32*	15.38*	15.98*	39.35**
		(8.922)	(8.028)	(8.837)	(14.99)
Associate professor		3.946	3.275	3.720	14.08**

(Continues)

Table A4. Continued

Model	(1)	(2)	(3)	(4)	(5)
		(4.790)	(4.893)	(4.626)	(6.416)
Assistant professor		4.708	0.970	1.291	5.788
		(4.136)	(4.136)	(4.006)	(7.156)
Anonymity		−0.800	−1.413	−1.153	−2.016
		(3.117)	(3.384)	(3.672)	(3.440)
Female		11.15	9.690	13.03	13.41
		(9.276)	(10.83)	(12.91)	(13.11)
Solicitor group A		−1.498	−4.633	3.721	9.357
		(2.057)	(5.585)	(4.802)	(6.632)
Constant	19.07***	14.67***	17.24***	7.930	−3.507
	(2.909)	(4.777)	(5.730)	(7.858)	(11.18)
School dummy	No	No	Yes	No	No
Department dummy	No	No	No	Yes	Yes
Observations	188	188	188	188	188
R-squared	0.039	0.108	0.150	0.184	0.225

Notes: Standard errors clustered by division are in parentheses.
***Significant at 1%.
**Significant at 5%.
*Significant at 10%.

Table A5. Social Comparison among Different Treatments (Outliers Included)

Treatment	Leader	Peer	Stranger	Leader	Peer	Stranger
Leaders' giving	0.205**	0.103	0.0113	0.254**	0.151***	0.240
	(0.0797)	(0.0797)	(0.0486)	(0.0925)	(0.0283)	(0.151)
Professor				38.04*	13.24	0.923
				(19.60)	(13.85)	(17.10)
Associate professor				4.761	−0.0485	15.05
				(3.522)	(7.418)	(20.00)
Assistant professor				8.737*	1.936	1.070
				(4.281)	(9.380)	(14.97)
Anonymity				1.155	−1.580	3.950
				(4.483)	(9.065)	(7.845)
Female				−19.50	17.77	19.85
				(11.52)	(19.96)	(33.27)
Solicitor group A				7.253	11.96	−6.393
				(9.245)	(7.997)	(5.830)
Constant	12.41***	19.36***	19.07***	−10.11	6.642	−5.010
	(2.867)	(4.463)	(2.896)	(6.722)	(13.18)	(27.14)
Department dummy	No	No	No	Yes	Yes	Yes
Observations	68	64	56	68	64	56
R-squared	0.074	0.014	0.000	0.583	0.482	0.372

Notes: Robust standard errors clustered at department level are in parentheses.
***Significant at 1%.
**Significant at 5%.
*Significant at 10%.

Appendix C: Zero Contribution and Anonymity Choice

In our experiment, solicitees are allowed to make a zero contribution and are also allowed to choose to be anonymous when giving a positive amount. In this subsection, we use our model to shed some light on these two choices. If the follower

chooses to contribute zero before knowing the existence of the leader's contribution, we can take $\beta = 0$, that is, there is no social comparison. The follower will choose to contribute zero if

$$\alpha_W + \alpha_G + (1-a)\theta < 1, \tag{10}$$

that is, the marginal utility from the pure and impure altruism and the social approval is smaller than the marginal benefit of private consumption. If we further assume that zero contribution will not be recorded or publicized, then the follower will choose to contribute zero without the presence of social comparison if

$$\alpha_W + \alpha_G < 1. \tag{11}$$

If the follower chooses to contribute zero after knowing the leader's contribution, then from Equation 5, we have

$$\alpha_W + \alpha_G + 2\beta\gamma g_L + (1-a)\theta < 1, \tag{12}$$

that is, the sum of the marginal utility of altruism, conformity to the social norm, and social approval is smaller than the marginal benefit of private consumption.

As a summary, the follower will contribute zero if and only if:

- $\alpha_W < 1 - \alpha_G$, under anonymity and without social comparison;
- $\alpha_W < 1 - \alpha_G - \theta$, under non-anonymity and without social comparison;
- $\alpha_W < 1 - \alpha_G - 2\beta\gamma g_L$, under anonymity and with social comparison;
- $\alpha_W < 1 - \alpha_G - \theta - 2\beta\gamma g_L$, under non-anonymity and with social comparison.

PROPOSITION 2. If the follower chooses to contribute a positive amount without social comparison, he must contribute a positive amount with social comparison, given the same anonymity condition. If the follower chooses to contribute a positive amount in an anonymous setting, he must contribute a positive amount in a non-anonymous setting, given the same condition for social comparison.

We cannot do an intent-to-treat analysis on the zero giving cases for the following reasons. When the experiments were designed, we focus purely on the treatment effect on the treated and try to have a relatively balanced sample among different information treatments. A donor was assigned into different treatments only after they agreed to give. The intention to treat is not really "random" or "endogenous" in the following sense. If a donor agreed to give was assigned to treatment A, all the followed solicitations are intent for the next treatment B, until somebody agreed to give. This procedure generates \$0 giving cases dynamically for different treatments, that is, they are not randomly assigned to each treatment in advance but depending on the treatment sequence and the solicitation process. Practically, we cannot do the intent-to-treat estimation because of a caveat of our experiment, that is, the time was not recorded when the \$0 giving happened between the change of treatments.

Now consider the case when the follower can choose being anonymous or not endogenously. Given the follower's optimal contribution in Equation 5, denote $g^*_{F,0} = \frac{\alpha_W - (1-\alpha_G) + \theta}{2\beta} + \gamma g_L$ as the follower's optimal contribution under the non-anonymous environment, and $g^*_{F,1} = \frac{\alpha_W - 1 + \alpha_G}{2\beta} + \gamma g_L$ as the follower's optimal contribution under the anonymous environment. Correspondingly, we can derive the follower's maximized utility $U^*_{F,0}$ and $U^*_{F,1}$ when g_F is equal to $g^*_{F,0}$ and $g^*_{F,1}$ respectively. Denote $\Delta g^*_F \equiv g^*_{F,0} - g^*_{F,1} = \frac{\theta}{2\beta}$.

$$\begin{aligned}
\Delta U^*_F &\equiv U^*_{F,0} - U^*_{F,1} \\
&= (\alpha_W - 1 + \alpha_G)\Delta g^*_F - \beta\left(g^*_{F,0} + g^*_{F,1} - 2\gamma g_L\right)\Delta g^*_F + \theta\left(g^*_{F,0} - g_S\right) \\
&= (\alpha_W - 1 + \alpha_G)\frac{\theta}{2\beta} - \beta\left(g^*_{F,0} + g^*_{F,1} - 2\gamma g_L\right)\frac{\theta}{2\beta} + \theta\left(g^*_{F,0} - g_S\right) \\
&= (\alpha_W - 1 + \alpha_G)\frac{\theta}{2\beta} + \left(g^*_{F,0} - g^*_{F,1}\right)\frac{\theta}{2} + \theta\gamma g_L - \theta g_S \\
&= (\alpha_W - 1 + \alpha_G)\frac{\theta}{2\beta} + \frac{\theta^2}{4\beta} + \theta\gamma g_L - \theta g_S
\end{aligned}$$

The follower chooses to be non-anonymous if $\triangle U^*_F > 0$, that is, $\theta > 4\beta g_S - 2(\alpha_W - 1 + \alpha_G) - 4\beta\gamma g_L$. This condition implies that, given a fixed set of altruistic and social comparison parameters, if the marginal benefit from being perceived as generous (θ) is high enough or the cutoff contribution level, beyond which the follower is regarded as generous (g_S), is low

Table A6. Results of Logit Estimation on Giving and Anonymity Choice

Dependent Variables	No Donation Dummy	Anonymity Dummy	Giving at $level_1$	Giving at $level_2$	Giving at $level_3$
Leader treatment		−0.264	0.132**	−0.0145*	−0.0767
		(0.234)	(0.0542)	(0.00833)	(0.0490)
Peer treatment		−0.0630	−0.000407	−0.000250	−0.0214
		(0.124)	(0.0498)	(0.0102)	(0.0451)
Leaders' giving		−0.00420	−0.0375***	0.00557***	0.00256***
		(0.00283)	(0.00255)	(0.000904)	(0.000903)
Leaders' giving		−0.0198	−0.00593***	0.000847***	0.00168
* Leader treatment		(0.0127)	(0.00197)	(0.000241)	(0.00120)
Leaders' giving		0.00323	−0.00166*	0.000396	0.000902
* Peer treatment		(0.00321)	(0.000896)	(0.000251)	(0.000846)
Female	−0.0929	−0.118	0.0673*	−0.00763	−0.0445
	(0.151)	(0.120)	(0.0370)	(0.0111)	(0.0384)
Professor	−0.0114	0.213	−0.142	0.00457	0.176
	(0.135)	(0.317)	(0.188)	(0.0199)	(0.191)
Associate professor	0.0708	0.0758	0.0369	−0.00628	−0.00788
	(0.109)	(0.192)	(0.0592)	(0.00966)	(0.0848)
Assistant professor	−0.0165	0.331*	0.0144	−0.00474	−0.00444
	(0.114)	(0.177)	(0.0550)	(0.00940)	(0.0662)
Solicitor group A	−0.221***	0.0823	−0.0676	0.0137	−0.0311
	(0.0401)	(0.162)	(0.0931)	(0.0152)	(0.0810)
Department dummies	Yes	Yes	Yes	Yes	Yes
Observations	278	184	184	184	184
Pseudo *R*-squared	0.0563	0.337	0.171	0.160	0.241

Notes: Standard errors clustered by division are in parentheses. $level_1$, $level_2$, and $level_3$ represent $g_F \leq 10$, $10 < g_F \leq 20$, and gF > 20, respectively.
***Significant at 1%.
**Significant at 5%.
*Significant at 10%.

enough, the followers will choose to be non-anonymous. A higher altruism concern ($\alpha_G + \alpha_W$) or a larger contribution amount given by the social norm also leads to a higher probability of choosing non-anonymous.

PROPOSITION 3. Given the altruistic and social comparison parameters, the followers will choose to be non-anonymous if the marginal benefit from being perceived as generous, θ, is high or the cutoff contribution level for social approval, g_S, is low.

Empirically, in order to evaluate the probability of giving for potential donors, we estimate the following Logit model:

$$P(I(g_{Fi}>0)) = G\left(\beta_0 + X_i\beta_X + \sum_{k=1}^{19}\gamma^k division_i^k + \sum_{j=1}^{2}\delta^j solicit_i^j\right), \tag{13}$$

where $G(Z) = e^Z/(1 + e^Z)$, I is an indicator function, and X_i are the characteristics of the followers. $division_i^k$ is the division dummy and $solicit_i^j$ is the solicitor dummy. We do not incorporate the leader's giving and treatment effects in the decision of giving to the charity. As discussed in the experimental design, the followers rejected to give before they were shown the giving information of their leaders, so we cannot allocate the non-giving decision to any particular treatment. The estimation results are shown in column 1 of Table A6. The solicitor group has a significant effect in affecting people's decision to give. This may be due to the difference in the communication skills and appearance of the solicitors, which might be important in affecting donors' giving behavior. Most of the department dummies are significant, suggesting that there exists a systematic difference in charitable giving behavior across academic departments.

For the decision of choosing anonymity, we estimate the following Logit model:

$$P(A_{Fi}=1)=G\left(\beta_0+\beta_e G_{Li}+X_i\beta_X+\sum_{k=1}^{23}\gamma^k division_i^k+\sum_{j=1}^{2}\delta^j solicit_i^j\right), \quad (14)$$

where A denotes the anonymity choice; it is equal to 1 if the followers choose to be anonymous and equal to 0 otherwise. The results in column 2 of Table A6 show that Assistant Professors are more likely to choose to be anonymous, everything else being equal. The interpretation is that junior professors might be more sensitive about how to behave and choose to be anonymous as a safe strategy. In both the Leader and Peer treatments, people are less likely to choose to be anonymous, but these estimates are not significant.

We estimate the following Logit model on giving at different levels separately:

$$P\left(g_{Fi}=level_{1,2,3}\right)=G\left(\beta_0+\beta_e G_{Li}+X_i\beta_X+\sum_{k=1}^{23}\gamma^k division_i^k+\sum_{j=1}^{2}\delta^j solicit_i^j\right), \quad (15)$$

where $level_1$, $level_2$, and $level_3$ represent the followers' giving level $g_F \le 10$, $10 < g_F \le 20$, and $g_F > 20$. Subjects in the Leader treatment are much more likely to give at the level of \$10 and less likely to give at the higher level such as \$20 and \$50, relative to the Stranger treatment. This is consistent with the summary statistics and the average treatment effects when the leaders' giving is small. The higher the leaders' giving amount, the less likely the followers give at a lower level. Such a pattern is much more salient for the Leader treatment. These are all consistent with the findings in the reduced-form analysis.

We also tried to incorporate the \$0 giving cases and anonymity choice into the analysis by directly modeling zero contribution before treatments and estimating a fully structured model. The estimates can shed lights on the general preference structure of potential donors, especially the zero givers. The results (available from the authors) highlight the importance of both social comparison and altruism in affecting followers' giving decision.

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